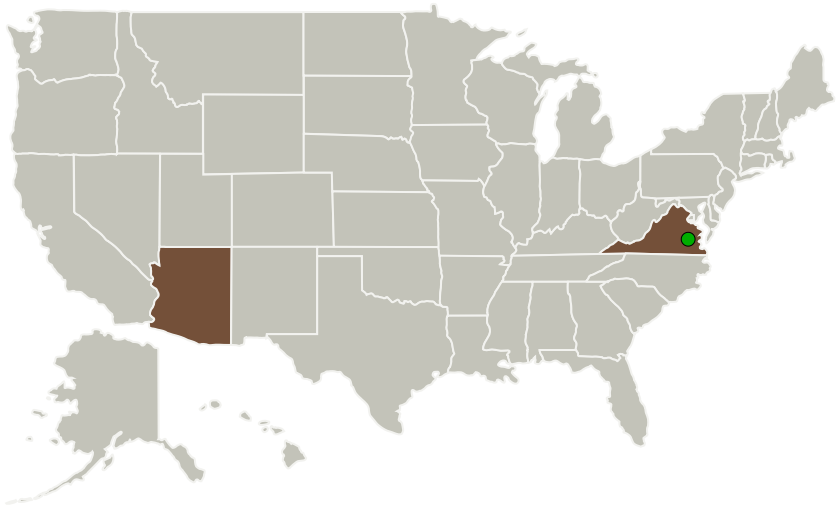
Linearized FUN3D for Rapid Aeroelastic and Aeroservoelastic Design and Analysis, Phase II

Completed Technology Project (2015 - 2017)

Project Introduction

In Phase I, a prototypical FUN3D-based ZONA Euler Unsteady Solver (FunZEUS) was developed to generate the Generalized Aerodynamic Forces (GAFs) due to structural modes, control surface kinematic modes, and gust excitation using a frequency-domain linearized unstructured Euler solver based on the Navier-Stokes solution of FUN3D as the steady background flow. These GAFs can lead to a state-space equation representing the plant model for rapid aeroelastic and aeroservoelastic (ASE) design and analysis. The overall technical objective of Phase II is to develop and validate a production-ready FunZEUS that will be developed by enhancing the prototypical FunZEUS (1) to drastically improve its computational efficiency; (2) to expand its commercialization potential by interfacing with other commercial CFD codes; (3) to include the static aeroelastic effects in the GAF generation; (4) to demonstrate its applicability to complex configurations; (5) to showcase its plant model generation capability using spoilers and other control surfaces; and (6) to improve its maintainability and modularity by integrating all modules in a ZONA's database and dynamic memory management system.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
ZONA Technology, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Scottsdale, Arizona
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Arizona	Virginia

Project Transitions

April 2015: Project Start

April 2017: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137555)*

Images

Briefing Chart
Linearized FUN3D for Rapid Aeroelastic and Aeroservoelastic Design and Analysis Briefing Chart *(https://techport.nasa.gov/image/126841)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
ZONA Technology, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

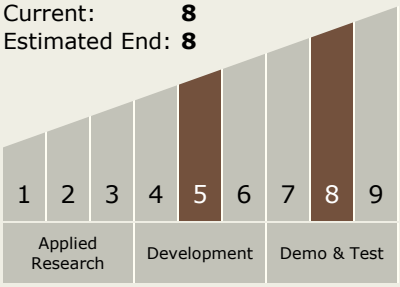
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Shuchi Yang

Technology Maturity (TRL)

Start: **5**
Current: **8**
Estimated End: **8**



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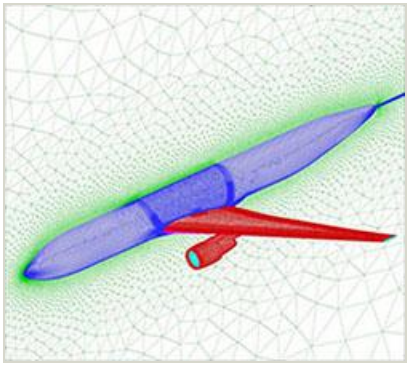

Final Summary Chart Image
Linearized FUN3D for Rapid Aeroelastic and Aeroservoelastic Design and Analysis, Phase II Project Image
(https://techport.nasa.gov/image/126033)

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.3 Aeroelasticity

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System